Bonneville Power Administration
Fish and Wildlife Program FY98 Proposal Form

How this form is structured

There are ten major sections to this form. Sections 1 through 5 are database-style fields in which brief, specific information is being sought. These sections include: General Administrative Information; Key Words; Objectives, Tasks and Schedules; Relationship to Other Bonneville Projects; and Budget. Type just above the lines, or in the appropriate areas in the tables. If more rows are needed in a table, press Alt-Insert.

Sections 6 through 10 accept a narrative format in which more open-ended questions are asked and you may respond at length in paragraph form. Descriptions are provided on the form. These sections include: Abstract, Description, Relationships to Other Projects, Personnel, Information/Technology Transfer. Replace the "Type here..." text with your own.

Steps to complete the form

1. First, read the Guidelines to Proposals.
1. Second, save this form. For ongoing projects, use your project number.WPD (example: 8909900.WPD). For new proposals, use a filename other than BLANK.WPD, preferrably your agency acronym and your initials (example: NMFSWS1.WPD).
2. Fill in all fields in the first 5 sections, using arrow keys or a mouse to move from one one field to the next. Then fill in narrative input areas, pressing down arrow to advance.
3. Print the completed document.
4. Save the document to diskette and mail both paper and diskette to:
   Bonneville Power Administration - EW
   ATTN: Connie Little
   FY99 Proposals
   P.O. Box 3621
   Portland OR 97208-3621

Call Jim Middaugh at the Northwest Power Planning Council (503) 222-5161 or (800) 222-3355 or email middaugh@nwppc.org if you have additional questions.

Proposals must be received to Bonneville by 5pm PST on Friday, January 23, 1998. Late proposals will not be reviewed for FY99 funding. This information will be the only material submitted for independent scientific review. It is essential that the relevant information be provided completely but concisely.

Section 1. General administrative information

Title of project. 75 characters or less; do not include the contractor name or acronym; use abbreviations if appropriate; start with action verbs, i.e., "Evaluate Coho...", not "Evaluation of Coho".
Evaluate Meadow Creek Instream Structure and Riparian Restoration.

Bonneville project number, if an ongoing project 5519100

Business name of agency, institution or organization requesting funding
USFS, Wallowa-Whitman National Forest, La Grande Ranger District

Business acronym (if appropriate) USFS

Proposal contact person or principal investigator:

Name	Paul L. Boehne
Mailing Address	3502 Hwy 30
City, ST Zip	La Grande OR, 97850
Phone	(541)-962-8521
Fax	(541)-962-8580
Email address	NA

Subcontractors. List other agencies or entities that will receive funding under this project, either through sub-contracts managed by the project sponsor or, where multiple agencies are involved as joint sponsors, through primary contracts managed by Bonneville. If another entity will be responsible for the long term maintenance of the project, identify them here.

Joint Sponsors - Primary Contracts
List one subcontractor per row; to add more rows, press Alt-Insert from within this table

Organization	Mailing Address	City, ST Zip	Contact Name
PNW Research Station	3200 Jefferson Way	Corvallis OR, 97331	Dr. James Sedell
Department of Fish & Wildlife, OSU	104 Nash Hall	Corvallis OR, 97331	Dr. J. Boone Kauffman
Department of Forest Engineering, OSU	Peavy Hall	Corvallis OR, 97331	Dr. R.L. Beschta

NPPC Program Measure Number(s) which this project addresses. Refer to 1994 Fish and Wildlife Program as amended in 1995; NPPC staff will proof this field and correct if necessary; separate multiple measure numbers with commas.

Measure 205 - Coordinated Implementation, Monitoring and Evaluation

NMFS Biological Opinion Number(s) which this project addresses. If the project relates to the Kootenai Sturgeon Biological Opinion, the NMFS Hydrosystem Operations Biological Opinion, or other Endangered Species Act requirements, enter the Action Number and Biological Opinion Title.

LRMP Biological Opinion for Snake River Basin ESU Summer Steelhead

LRMP Biological Opinion for Snake River Basin ESU Spring/Summer Chinook Salmon

Starkey Range Allotment Biological Opinion

Other planning document references. If the project is called for in the National Marine Fisheries Service *Snake River Salmon Recovery Plan*, or in *Wy Kan Ush Me Wa Kush Wit*, the Anadromous Fish Restoration Plan of the Nez Perce, Umatilla, Warm Springs and Yakama tribes, in U.S. Forest Service or Bureau of Reclamation land management plans, or in local area sub-basin or watershed plans, or in other planning documents, provide the name of the plan and reference citation where the need is identified.

If the project type is "Watershed" (see Section 2), reference any demonstrable support from affected agencies, tribes, local watershed groups, and public and/or private landowners, and cite available documentation.

NMFS Proposed Recovery Plan for Snake River Salmon - Ecological Goal 10- Chapter V-1-16.

NMFS Proposed Recovery Plan for Snake River Salmon- Tasks to Begin Recovery- Chapter V-1-45.

Upper Grande Ronde River Anadromous Fish Habitat Protection, Restoration and Monitoring Plan- Survey/Inventory/Monitoring page 17 & 18.

Grande Ronde Model Watershed Program- Operations Action Plan- Appendix B-4.

Upper Grande Ronde River Basin Watershed Analysis-USFS

Subbasin. List subbasin(s) where work is performed. Use commas to separate multiple subbasins. Coordination projects or those not affecting particular subbasins may omit this field.

Grande Ronde River

Short description. Describe the project in a short phrase (less than 250 characters). Give information that is not in the title. If possible start this field with an action verb (protect, modify, develop, enhance, etc.) rather than a noun (this project protects). There is room for a more detailed project abstract later in the narrative section, so please keep

this answer short.

Continue the life history work on summer steelhead smolt outmigrant trapping, juvenile rearing and habitat capability, and determination of winter habitat capability. Riparian work includes assessment of cattle and big game influences on recovery rates on species, and biomass, and on channel structure and habitat diversity. Both passive and active restoration efforts are evaluated.

Section 2. Key words

For identifying and sorting, mark key words below that most specifically describe this project. Under each heading (Programmatic Categories, Activities, Project Types), find the **one** item that most applies to your project, and mark it with an X in the Mark column. If other items in the same heading also apply, mark them with a plus sign or asterisk.

Mark	Programmatic Categories	Mark	Activities	Mark	Project Types
X	Anadromous fish		Construction	X	Watershed
	Resident fish		O & M		Biodiversity/genetics
	Wildlife		Production	+	Population dynamics
	Oceans/estuaries	X	Research	+	Ecosystems
	Climate	+	Monitoring/eval.		Flow/survival
	Other		Resource mgmt		Fish disease
			Planning/admin.		Supplementation
			Enforcement		Wildlife habitat en-
			Acquisitions		hancement/restoration

Other keywords. If there are other key words that would help identify your project, enter them below, separated by commas; example key words: DNA, stock identification, life history, sampling, modeling, nutrient dynamics, predation, hydrodynamics, gas bubble disease, disease names, hatchery-wild interactions, ecological interactions.

Sampling, life history, riparian vegetation, recovery, restoration

Section 3. Relationships to other Bonneville projects

Describe any interdependencies with other projects funded under the Fish and Wildlife Program. Don't include general relationships to other projects, but target those that depend on this project being funded, or vice versa. There is room in Section 7 below to comment on other relationships or to describe these more fully.

If you need more rows, press Alt-Insert from within this table.

Project #	Project title/description	Nature of relationship
DE-AI79-	Meadow Creek Project (84-9) under BPA closed contract.	This project continues the monitoring of life history strategies

84BP17578	Grande Ronde River Habitat Enhancement. This project funded the implementation of the instream work and riparian fencing and the research for the first two years of the riparian recovery work.	and riparian vegetation recovery

Section 4. Objectives, tasks and schedules

This section has three parts: a) Objectives and tasks table, b) Objective schedules and costs table, c) other schedule fields. Instructions for each part follow the headings.

Objectives and tasks

Briefly describe measurable objectives and the tasks needed to complete each objective. Use Column 1 to assign numbers to objectives (for reference in the next table), and Column 3 to assign letters to tasks. Use Columns 2 and 4 for the descriptive text. Objectives do not need to be listed in any particular order, and need only be listed once, even if there are multiple tasks for a single objective. List only one task per row; if you need more rows, press Alt-Insert from within this table.

The overall project goal is to determine effectiveness of instream and riparian restoration measures on improving salmonid life history strategies thereby contributing to the Northwest Power Planning Council's goal of improving anadromous fish runs in the Columbia River Basin.

Hypothesis and Assumptions

Hypotheses:
1) Riparian/stream ecosystems and the salmonids that depend upon them can be successfully restored through a combination of passive and active restoration approaches;

2)Riparian area restoration in an Intermountain stream system will improve water quality, channel morphology, and instream productivity over time, thereby leading to an increase in the systems' capability to produce salmonid smolts;

3)The removal of livestock grazing from Meadow Creek reaches (e.g. passive restoration) will initiate the recovery of both riparian hardwood communities and meadow communities. Principal responses of this passive restoration technique included increased density and reproduction in the shrub dominated communities, changes in water quality, and increased root biomass, water infiltration rates, and bank structure/channel complexity; and

4)Active restoration approaches in concert with passive restoration can influence salmonid productivity through the re-connection of linkages between the water column and floodplain. This includes lowered stream temperatures, enhanced riparian vegetation

structure and diversity, and a biogeochemistry that reflects the riparian influences on the aquatic system.

Assumptions:
1) The main assumption is that smolt production can be measured accurately with smolt traps. The estimation techniques used are limited by the sample size. Meadow Creek is underseeded but the estimation of all life history stages and the linkages with habitat variables should allow for habitat utilization.

2) In addition, we assume that restoration activities will result in measurable improvements of habitat features and ultimately, increases in steelhead numbers. Short term habitat features to be measured include the vegetation, soil, water, and stream channel responses.

Obj 1,2, 3	**Objective**	**Task a,b,c**	**Task**
1	Quantify factors limiting the production of anadromous salmonids in Meadow Creek	a	Habitat survey and mapping
		b	Redd surveys
		c	Stream temperature monitoring
		d	Smolt sampling
		e	Stream flow monitoring
2	Based on limiting factor analysis, identify restoration techniques that will increase production of anadromous salmonids in Meadow Creek		
3	Quantify and analyze data on habitat characteristics, fish populations and assemblages, and salmonid smolt production to evaluate life history strategies of summer steelhead	a	Spring smolt trapping
		b	Summer habitat/fish sampling
		c	Habitat mapping
		d	Stream flow monitoring
4	Quantify channel response to passive and active restoration	a	Channel transects
		b	Stream flow monitoring
		c	Habitat surveys and mapping

5	Quantify the nutrient, physical, and biotic linkages between riparian and aquatic zones that influence the habitat quality of salmonids in Meadow Creek	a	Stream water chemistry monitoring
		b	Channel transects
		c	Habitat surveys and mapping
6	Determine the differences in the ecosystem processes that link floodplain and aquatic environment between intact and degraded riparian zones. This includes quantification in forested reaches, meadow reaches and shrub reaches of Meadow Creek.	a	Habitat survey and mapping
		b	Stream temperature monitoring
		c	Stream flow monitoring
		d	Stream water chemistry monitoring
		e	Riparian vegetation surveys/transects
7	Quantify growth and reproductive response of riparian hardwoods to appropriate passive and active restoration approaches.	a	Riparian vegetation surveys/transects
		b	Plant growth and biomass measurements
8	Quantify the rates of establishment and densities of woody species on riparian sites undergoing restoration.	a	Riparian vegetation surveys/transects
		b	Plant growth and biomass measurements
9	Quantify the influences of native ungulates and beaver on shrub composition, structure, and recovery.	a	Plant growth and biomass measurements
10	Quantify the influences of different intensities of livestock grazing on parameters that may influence salmonid habitats-	a	Stream water chemistry monitoring

	water quality, run-off, infiltration, channel and riparian physical properties, nutrient cycling, and water quality.		
		b	Stream flow monitoring
		c	Litter fall
		d	Channel and soil measurements
		e	Plant transects

Objective schedules and costs

Partition overhead, administrative, support, and any other common costs shared among objectives. The cost percentages from all objectives should total 100%. Enter just the objective numbers from Column 1 in the above table. Enter start and end dates for each objective using the mm/yyyy format (e.g. 05/2002 for May, 2002).

If you need more rows, press Alt-Insert.

Objective #	Start Date mm/yyyy	End Date mm/yyyy	Cost %
1	10/1997	09/1998	20
2	06/1998	08/1998	5
3	03/1998	08/1998	10
4	06/1998	09/1998	5
5	06/1998	09/1998	5
6	06/1998	09/1998	10
7	06/1998	09/1998	10
8	06/1998	09/1998	5
9	06/1998	09/1998	10
10	06/1998	09/1998	20

Schedule constraints. Identify any constraints that may cause schedule changes. Describe major milestones if necessary.

Completion date. Enter the last year that the project is expected to require funding.
2003

Section 5. Budget

This section has two tables: 1) FY98budget by line item, and 2) Outyear costs. Instructions for each part follow the heading.

FY98budget by line item

List FY98budget amounts for each category. If an item needs more explanation, provide it in the Note column. If the project uses PIT tags, include the cost ($2.90/tag). **Be sure to enter a total on the last line: this is the amount of your budget request.**

Item	Note	FY98
Personnel		
OSU Fish & Wildlife	Principle Investigator (PI), GRA	37,846
OSU Forest Engineering	PI	10,000
FS-PNW	PI, Technician	35,000
FS- LAG	Technicians	38,000
Fringe benefits	OSU Fish & Wildlife	5,078
Supplies, materials, non-expendable property	Fish and Wildlife	3,500
	Forest Engineering	1,000
	FS-PNW	2,000
	FS-LAG	500
Operations & maintenance		0
Capital acquisitions or improvements (e.g. land, buildings, major equip.)	FS-PNW (1) smolt trap	15,000
PIT tags	# of tags:	0
Travel		
OSU Fish & Wildlife		5,000
OSU Forest Engineering		1,000
FS-PNW		6,000
FS-LAG		0
Indirect costs		
OSU Fish & Wildlife	Overhead 42.5%	21,855
OSU Forest Engineering	Overhead 42.5%	4,250
FS-PNW	Overhead 15.0%	5,250
FS-LAG	Overhead 15.0%	5,700
Subcontracts	Union County Watermaster (2) gaging stations for water year	12,000
Other	OSU Fish &Wildlife Graduate Tuition	10,566
TOTAL		219,545

Outyear costs

List budget amounts for the next four years, and the estimated percentage of those costs for operations and maintenance (O&M).

Outyear costs	FY1999	FY2000	FY01	FY02	FY03

Total budget	219,545	220,000	240,000	265,000	295,000
O&M as % of total	0	0	0	0	0

Section 6. Abstract

A condensed description to briefly convey to other fish and wildlife scientists, managers and non-specialists the background, objectives, approach and expected results. **In under 250 words,** include the following:

a. Specific items in any solicitation being addressed
b. Overall project goals and objectives
c. Relevance to the 1994 Columbia Basin Fish and Wildlife Program (benefit to fish and wildlife)
d. Methods or approach based on sound scientific principles
e. Expected outcome and time frame
f. How results will be monitored and evaluated

This project continues the life history work of summer steelhead smolt outmigrant trapping, juvenile rearing and habitat capability, and determination of winter habitat capability started in 1987. The life history information will be invaluable in determining restoration needs for summer steelhead in the Snake River Basin. A limiting factor analysis will developed for Snake River summer steelhead for determining restoration projects. Riparian vegetation work includes assessment of cattle and big game impacts on riparian species composition, biomass and recovery rates. This will be assessed on treated and untreated reaches using permanently marked species and quantified along permanent transects. Water chemistry and channel structure related to riparian vegetation will also be assessed using channel transects to determine width:depth ratios, pool frequency and depth and changes in wetted width. This will be invaluable in determining approaches to restoration actions for riparian vegetation and aquatic habitat in the Snake River Basin for summer steelhead and spring/summer chinook salmon. This should be completed by 2003.

Section 7. Project description

This full description of the project should be in sufficient detail to include the following information under headings a through g **(maximum of 10 pages for entire project description)**:

a. Technical and/or scientific background. The overall problem should be clearly identified with background history and scientific literature review, if a research project. Location should be specific, if relevant. Goals and objectives of the 1994 Fish and Wildlife Program (FWP), NMFS Biological Opinion, or other plans in relation to the proposed project should be stated and described in some detail. Indicate whether the project mitigates losses in place, in kind, or if out-of-kind mitigation is being proposed.

Show how the proposed work is a logical component of an overall conceptual

framework or model that integrated knowledge of the problem. The most significant previous work history related to the project, including work of key project personnel on any past or current work similar to the proposal, should be reviewed. All work should be adequately referenced and listed at the end of this field.

Instream and riparian habitat improvement projects have been funded in the Columbia River Basin to the amount of over $200 million. Although this represents a large number of improvement efforts, the associated number of evaluations of this work has been suprisingly low. Continued funding of improvement projects without knowledge of the benefits to salmonid production raised the question of the past 20 years- "Are we producing Paper Fish?"

The need for understanding life history strategies of summer steelhead in the Grande Ronde Basin will provide the basis for identifying limiting factors which will aid in the selection of appropriate restoration techniques to improve tributary ecosystem recovery goals. Much is unknown about the early life history strategies of summer steelhead in tributary ecosystems. This project will provide necessary insight into the early life history of summer steelhead. Smolt production of the tributary ecosystem will be the focus of the monitoring.

In spite of the large expenditures of funds spent on restoration activities, we know little about the rate of patterns of riparian recovery. This is important in order for managers to prescribe the most ecological appropriate, as well as most cost-effective means of restoration. In order to ascertain the ecosystem response to restoration activities, we will quantify changes or development of important ecosystem features that have direct influences on salmonid populations following project implementation. This includes changes in riparian vegetation composition and structure, changes in soil and water properties and changes in stream channel characteristics. Restoration activities to be examined included the cessation of livestock grazing, construction of exclosures to both big game and cattle influences; placement of wood debris in channels and the re-opening of historic channels at sites that were previously channelized.

To maximize the effectiveness of a habitat program a coordinated approach is necessary where adequate funds are available for program and project planning, implementation, and long term evaluation of results. This long term evaluation fo both the physical and biological habitat elements both instream and riparian areas on Meadow Creek will be crucial in understanding recovery strategies and evaluation progress to achieving recovery goals for summer steelhead. This is currently one of the only long term projects of its kind in the interior Columbia River Basin.

b. Proposal objectives. Specific, measurable objectives or outcomes for the project should be presented concisely in a numbered list. Research proposals must concisely state the hypotheses and assumptions necessary to test these. Non-scientific projects must also state their objectives. Clearly identify any products (reports, structures, etc.) that would result from this project. For example, an artificial production program may state the

species composition and numbers to be produced, their expected survival rates, and projected benefits to the FWP. A land acquisition proposal may state the conservation objectives and value of the property, the expected benefits to the FWP, and a measurable goal in terms of production. Methods and tasks (in heading e, below) are to be linked to these objectives and outcomes (by number).

Obj 1,2, 3	**Objective**	**Task a,b,c**	**Task**
1	Quantify factors limiting the production of anadromous salmonids in Meadow Creek	a	Habitat survey and mapping
		b	Redd surveys
		c	Stream temperature monitoring
		d	Smolt sampling
		e	Stream flow monitoring
2	Based on limiting factor analysis, identify restoration techniques that will increase production of anadromous salmonids in Meadow Creek		
3	Quantify and analyze data on habitat characteristics, fish populations and assemblages, and salmonid smolt production to evaluate life history strategies of summer steelhead	a	Spring smolt trapping
		b	Summer habitat/fish sampling
		c	Habitat mapping
		d	Stream flow monitoring
4	Quantify channel response to passive and active restoration	a	Channel transects
		b	Stream flow monitoring
		c	Habitat surveys and mapping
5	Quantify the nutrient, physical, and biotic linkages between riparian and aquatic zones that influence the habitat quality of salmonids in Meadow Creek	a	Stream water chemistry monitoring
		b	Channel transects
		c	Habitat surveys and mapping
6	Determine the differences in the	a	Habitat survey and mapping

	ecosystem processes that link floodplain and aquatic environment between intact and degraded riparian zones. This includes quantification in forested reaches, meadow reaches and shrub reaches of Meadow Creek.		
		b	Stream temperature monitoring
		c	Stream flow monitoring
		d	Stream water chemistry monitoring
		e	Riparian vegetation surveys/transects
7	Quantify growth and reproductive response of riparian hardwoods to appropriate passive and active restoration approaches.	a	Riparian vegetation surveys/transects
		b	Plant growth and biomass measurements
8	Quantify the rates of establishment and densities of woody species on riparian sites undergoing restoration.	a	Riparian vegetation surveys/transects
		b	Plant growth and biomass measurements
9	Quantify the influences of native ungulates and beaver on shrub composition, structure, and recovery.	a	Plant growth and biomass measurements
10	Quantify the influences of different intensities of livestock grazing on parameters that may influence salmonid habitats-water quality, run-off, infiltration, channel and riparian physical properties, nutrient cycling, and water quality.	a	Stream water chemistry monitoring
		b	Stream flow monitoring
		c	Litter fall
		d	Channel and soil measurements
		e	Plant transects

c. Rationale and significance to Regional Programs. The rationale behind the proposed project should be presented and project objectives and hypotheses related as specifically as possible to the FWP objectives and measures or to other plans. You should make a convincing case for how the proposed work will further goals of the FWP. Relevant projects in progress in the Columbia Basin and elsewhere should be listed and discussed in relation to the proposed project. Arrangements should be identified and documented for cooperation and synergistic relationships among the proposed project, *other project proposals*, and existing projects. Any particularly novel ideas or contributions offered by the proposed project should be highlighted and discussed.

Geomorphic, hydrologic and ecological connectivity in Columbia River watersheds: implications for endangered salmonids. The US Environmental Protection Agency and the Naitional science Foundation. This is a companion project located on the John Day and Upper Grande Ronde Basins. Indispensable contributions in labor, scientific expertise, laboratory analysis, stream surveys and personnel from this project to the Meadow Creek project will occur.

d. Project history (for continuing projects). If the project is continuing from a previous year, the history must be provided. This includes projects that historically began as a different numbered projects (identify number *and short title*). For continuing projects, the proposal primarily will be an update of this section. List the following:

- project numbers (if changed)
- project reports and technical papers
- summary of major results achieved
- adaptive management implications
- years underway (see attached spreadsheet)
- past costs (see attached spreadsheet)

Meadow Creek, is a major tributary of the Upper Grande Ronde River. Meadow Creek and its riparian area have a long history of impacts dating back to early logging. Ungulate grazing in various degrees of intensity, has further impacted the riparian community. Salmonid populations in Meadow Creek are currently composed of anadromous summer steelhead and resident rainbow trout. Some spring/summer chinook smolts have also recently been found in Meadow Creek and tribal historical records indicate the stream once supported adult spring/summer chinook salmon.

Meadow Creek was identified in 1984 as one of the top ten priority streams in the Upper Grande Ronde subbasin in need of habitat improvement to be funded by Bonneville Power Administration (BPA) under the Northwest Power Council's Fish and Wildlife Program. The Meadow Creek project has also been selected for intensive, long-term evaluation of the physical, biological, and economic benefits of the direct habitat improvement work. By agreement, BPA funded the improvement work implemented by the la Grande Ranger District in 1990 and 1991 and USFS funded the evaluation efforts to be conducted by Pacific Northwest Research Station (PNW).

An extensive biological data base exists for Meadow Creek from aquatic research conducted since 1977. A habitat condition survey was completed by La Grande Ranger District in 1986. During 1987, Pacific Northwest Research (PNW) fisheries personnel began smolt sampling and development of a limiting factor analysis. Also in 1987, PNW personnel conducted a historical analysis of large, woody debris for comparison purposes with the current conditions. These surveys indicate a lack of quality pools, a poor width to depth ratio, streambank instablilty, poor overhead cover and a general deficiency of instream structural features favored by juvenile anadromous salmonids during summer and winter. The USDA FS, also in 1987, contracted with Washington State University to complete a hydrological analysis of the Meadow Creek subbasin, including design and location of needed habitat enhancement modifications covering eleven habitat improvement units (HIU) on four miles of stream. In 1988, a long-term research design for project evaluation was developed by PNW personnel and coordinated with the prescribed habitat enhancement modifications. Restoration modification covering approximately two lineal stream miles was completed in 1990.

Construction of a game-proof fence was completed in 1991. These fences along with the cattle fences maintained by the La Grande Ranger District provide the study area for the riparian vegetation work to be continued by Dr. J. Boone Kauffman of Oregon State University.

e. Methods. How the project is to be carried out based on sound scientific principles should be described (this is applicable to all types of projects). Include scope, approach, and detailed methodology. If methods are described in detail in another document, summarize here and cite reference. The methods should include, as appropriate, but not be limited to such items as:

- tasks associated specifically with objectives
- critical assumptions
- description of proposed studies, experiments, treatments or operations in the sequence that they are to be carried out
- any special animal care or environmental protection requirements
- any risks to habitats, other organisms, or humans
- justification of the sample size
- methods by which the data will be analyzed
- methods for monitoring and evaluating results
- kinds of results expected

Each proposer should complete the methods section with an objective assessment of factors that may limit success of the project and/or critical linkages of the proposal with other work (e.g., a smolt monitoring program, etc.).

Smolt production will be assessed utilizing 2 rotary smolt traps, operated from iceout to ice up. Smolt and presmolts will be estimated by a mark recapture techniques and estimates made using a efficiency coefficient for each trap. Summer carrying capacity wil be assessed by use of the Hankin Reeves basinwide habitat inventory and subsampling

habitat units for fish population and assembalges with an electrofishing unit. Population estimates will be made using a two pass removal technique. Adult escapement will be determined by redd counts in the spring through out the Meadow Creek System.

We will sample vegetation, soil, water and channel responses in both restored and paired untreated reaches. Intensive measurements on the changes in riparian ecosystem composition and structure following restoration will be made. Hardwood species have been permanently marked and will be measured annually to quantify parameters of growth, height, crown area, mainstem diameter, number of stems, biomass and reproductive effort. We have tagged 800 willows, cottonwoods and alder in areas under a variety of management scenarios: cattle grazed, ungrazed by cattle, ungrazed by all ungulates, areas where instream structures have been established, areas where historical channels have reopened. Changes in density and rates of establishment will be quantified in permanent transects to be measured annually.

In addition, we will also measure the ecological influences of vegetation recovery on salmonid habitats. These processes include year-long measurements of allocthonous inputs (litter), shade, changes in water chemistry (quality), and channel structure. These linkages are hypothesized to be a critical part of the restoration of endangered salmonid populations. In both treated and untreated areas, we will measure changes in litter inputs in willow, forest, and meadow reaches. We will also measure root biomass in the meadow reaches to ascertain the influence of recovery on channel structure. Changes in channel structure include pool frequency and depth, changes in quality/chemistry such as temperature, pH, conductivity, DOC, organic and inorganic N, and phosphate concentrations. All laboratory analyses will be conducted at Oregon State University research labs.

f. Facilities and equipment. All major facilities and equipment to be used in the project should be described in sufficient detail to show adequacy for the job. The proposal should indicate whether there are suitable (based on contemporary standards) field equipment, vehicles, laboratory and office space and equipment, life support systems for organisms, and computers, for example. Any special or high-cost equipment to be purchased with project funds should be identified and justified. Reference to other proposals is allowed but note that limitations of those proposals could effect the evaluation of the ones citing them.

USDA Forest Service: Starkey Experimental Forest and Range Administrative Headquarters.
Pacific Northwest Research Station Habitat Laboratory.

Oregon State University: Department of Fish & Wildlife Habitat Ecology Lab.

g. References. (Not included in 10-page limit for this section.) Provide complete citations to all publications referred to in Sections 6a-f. List in order: author(s), date, title, report number, publisher or agency, location. References will not be read by reviewers; the substance of any reference should be described in the text and the source cited. Sample

citation:

Referred Journal articles

Kauffman, J.B., R.L. Beschta, N. Otting, and D.L. Cummings. 1995. Ecological approaches to riparian restoration in Northeastern Oregon. Restoration and Management Notes 13;12-15.

Kauffman, J.B., R.L. Beschta, N. Otting, and D. Lytjen. 1997. An ecosystem perspective of riparian and stream restoration in the Western United States. Fisheries 22(5):12-24

Case, R.L. and J.B. Kauffman. 1997 Wild ungulate influences on the recovery of willows, black cottonwood and thin-leaf alder following cessation of cattle grazing in Northeastern Oregon. Northwest Science 71:115-125.

Book Chapters

Kauffman, J.B., N. Otting, D. Lytjen, and R.L. Beschta. 1996. Ecological priciples and approaches to riparian restoration in the Western United States. IN:Healing the Watershed: A Guide to Watershed and Natural Fisheries Restoration. Workbook #2, Healing the Watershed Series, Pacific Rivers Council, Eugene, Oregon.

Lytjen, D., N. Otting, and J.B. Kauffman. 1997. Relationships of riparian vegetation and hydrology in mountain streams in the Western USA: impacts of water diversion. A white paper report written to the USFS National Stream Team, FT. Collins CO.

Graduate Thesis

Case, R.L. 1995. The ecology of riparian ecosystems of Northeast Oregon: Shrub recovery at Meadow Creek and the structure and biomass of headwater Upper Grande Ronde ecosystems. MS Thesis, Oregon State University, Corvallis. 137p

Boehne P.L. 1996. Outmigration of wild summer steelhead juveniles in Meadow Creek, Oregon an upriver tributary of the Columbia Basin. MS Thesis. Humbolt State University, Arcata, California.

Lytjen, D. 1998. Physical and biotic influences on composition and structure of woody riparian vegetation in Northeastern Oregon. MS Thesis (in progress).

Otting, N. 1998. Structure of montane floodplain plant communities in relation to groundwater and soil texture gradients in the Upper Grande Ronde Watershed, Oregon. MS Thesis (in progress).

Miller, A.C. 1997. Response of juvenile steelhead trout to an instream habitat rehabilitation project in Meadow Creek,

Oregon. MS Thesis. Oregon State University, Corvallis, Oregon.

*Dwire, K. Connectivity of floodplain riparian areas and low-order streams of the Blue Mountains, Oregon. PhD. Dissertation (in progress), Oregon State University, Corvallis OR.

*Brookshire, J. The response of the riparian hardwood component to restoration and allocthonous inputs arising from forested and herbaceous riparian zones in Northeastern Oregon. MS Thesis (in progress), Oregon State University, Corvallis OR.

*Mahrt, M. Restoration and maintenance of riparian ecosystems in the Western USA: recovery of streamside vegetation and its effects on avian productivity an diversity. Ph.D. Dissertation (in progress), Oregon State University, Corvallis, OR.

*Funding for these three graduate research projects is dependent on this proposal.

Published Abstracts

Kauffman, J.B 1997. Natural disturbances and human perturbations that shape the biotic structure of riparian ecosystems. In: riparian and watershed management in the interior Northwest: an interdisciplinary perspective. A synposium held in La Grande, OR. September 11-12 1997.

Kauffman, J.B., R.L. Beschta, N. Otting, and D.Lytjen. 1997. An ecosystem perspective of riparian and stream restoration in the Western United States. Abstracts-1997 Annual meeting of the American Fisheries Society, Monterey CA, 1997.

Otting, N. 1997. Structure of montane floodplain plant communities in relation to groundwater gradients in the Upper Grande Ronde watershed, Oregon. Paper given at May 6, 1997 annual meeting of the PNW chapter of the Society of Wetland Scientists, La Sells Stewart conference Center, OSU, Corvallis, Oregon.

Case, R.L. J.B. Kauffman and D.L. Cummings. 1995. The resilience and recovery of willows, black cottonwood, and thin-leaf alder in Northeast Oregon. Page 213 In: W.D. Edge and S.L. Olsen-Edge (eds) Proceedings Sustaining Rangeland Ecosystems Symposium. Blue mountains Natural Resource Institute. La Grande, OR. pp:213.

Kauffman, J.B., J. Brookshire, K. Dwire, L. Ellingson and A. Thorpe. 1998. The influence of livestock on soil belwoground properties of montane riparian meadows communities in Northeastern Oregon. Abstracts of the 1998 ecological society of America meeting.

Everest, F.H., and P.L. Boehne. 1989. Habitat improvement for anadromous salmonids in Meadow Creek, Oregon, and evaluation of physical, biological, and economic benefits. Pacific Northwest Research Station, Corvallis, Oregon. 19pp.

Section 8. Relationships to other projects

Indicate how the project complements or includes collaborative efforts with other projects; put the work into the context of other work funded under the FWP. If the proposed project requires or includes collaboration with other agencies, organizations or scientists, or any special permitting to accomplish the work, such arrangements should be fully explained. If the relationship with other proposals is unknown or is in conflict with another project, note this and explain why.

This is not intended to duplicate the Relationships table in Section 3. Instead, it allows for more detailed descriptions of relationships, includes non-interdependent relationships, and includes those not limited to specific Bonneville projects.

Meadow Creek Summer Steelhead Life History reasearch/USDA Forest Service, PNW Research Station and Wallowa-Whitman National Forest. This project has been funded for 10 years by the USFS and the subject proposal will continue the life history investigation in a cooperative manner.

Geomorphic, hydrologic and ecological connectivity in Columbia River watersheds: implications for endangered salmonids. The US Environmental Protection Agency and the Naitional science Foundation. This is a companion project located on the John Day and Upper Grande Ronde Basins. Indispensable contributions in labor, scientific expertise, laboratory analysis, stream surveys and personnel from this project to the Meadow Creek project will occur.

Section 9. Key personnel

Include names, titles, FTE/hours, and one-page resumes for key personnel (i.e. principal investigator, project manager), and describe their duties on the project. Emphasize qualifications for the proposed work. Resumes should include name, degrees earned (with school and date), certification status, current employer, current responsibilities, list of recent previous employment, a paragraph describing expertise, and up to five recent or especially relevant publications or job completions.

Dr. J. Boone Kauffman, Associate Professor Department of Fish & Wildlife, OSU 104 Nash Hall, Corvallis OR, 97331

Habitat, disturbance and ecosystem ecology of riparian ecosystems

Dr. Robert L. Beschta, Professor, Department of Forest Engineering, OSU Peavy Hall, Corvallis OR, 97331

Wildland hydrology, riparian and channel disturbance and aquatic ecosystem linkages.

Dr. James R. Sedell, Research Ecologist and Acting Program Manager, USDA Forest Service PNW Research Station 437 NW 31st , Corvallis OR, 97330

Aquatic ecosystem interactions, fish habitat relationships and disturbance ecology

Paul L. Boehne Fisheries and Watershed Staff, La Grande Ranger District 3502 Hwy 30, La Grande OR, 97850

Fish habitat relationships, inchannel and riparian restoration and aquatic ecosystems interactions

Resumes and curriculum vitae will be supplied for key personnel at a later date.

Section 10. Information/technology transfer

How will technology or technical information obtained from the project be distributed or otherwise implemented? Methods can include publication, holding of workshops, incorporation in agency standards or facilities, and commercialization.

Technology transfer will take many forms including but not limited to graduate theses, journal articles, general technical reports, symposium proceedings and project reports to BPA and NWPPC and USDA Forest Service for adding to LRMP revisions and NMFS for Recovery Plan assessments.

Congratulations!

Thank you for completing the FY99 Proposal Form. Please print and save this file to diskette, and mail both to the address shown at the top of this document. To ensure a thorough review of your proposed work, this form will be screened for completeness. If it is not complete, it may be returned to you with a request for additional information.